	Α	В	С	D	E	F	G	Н
1		,	Appendix	B: Emissions Calculations				
2				Summary of Modification				
3								
4		Compa	ny Name:	MGPI of Indiana, LLC				
5			Address:	7 Ridge Avenue, Lawrenceburg, Indiana 47025				
6	Significant Source	Modifica	tion No.:	0296-35496-00005				
7	Significant Permit	Modifica	tion No.:	029-35505-00005				
8		F	Reviewer:	Kristen Willoughby				
9			Date:	12/22/2014				
10			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
11		,	<u>Ur</u>	ncontrolled Potential to Emit (tons/yr)				,
12	Emission Unit	PM	PM10	PM2.5 *	SO ₂	NOx	voc	СО
13	One (1) DDG Dryer, identifed as EU-39	418.77	418.77	418.77	18.84	27.86	418.77	464.28
14	Wet Pad (EU-40)	-	-	-	-	-	0.89	-
	2 Screw Conveyors, 1 Drag Conveyor, 3							
15	Product Conveyors, 1 K-Valve	2.55	1.42	0.24	-	-	-	-
16	Total	421.32	420.19	419.01	18.84	27.86	419.66	464.28
17	* PM2.5 listed is direct PM2.5						,	

	I
1	'
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	Total HAPs
13	39.36
14	0.04
15	-
16	39.40
17	

	A	В	С	D	ΤE	T F	G	Н	l l
1	,,			B: Emissions Calculations		<u> </u>	L		· · ·
2				Summary of Emissions					
				•					
3									
4		Compa	ny Name:	MGPI of Indiana, LLC					
一		-	_						
5			Address:	7 Ridge Avenue, Lawrenceburg, Indiana 47025					
6	Significant Source M	/lodific	ation No.:	0296-35496-00005					
7	Significant Permit N	/lodific	ation No.:	029-35505-00005					
8		ļ	Reviewer:	Kristen Willoughby					
9			Date.	12/22/14					
10			Date.	1 <i>6:66:</i> 17					
11				Emissions (ton/yr)					
12	Process/Emission Unit	PM	PM10	PM2.5	SO2	NOx	VOC	СО	GHG
13				PTE (New Units)	•	•			
14								-	
15	DDG Dryer (EU-39)	8.38	8.38	8.38	18.84	27.86	8.38	46.43	27,473
16	Wet Pad (EU-40)	-	-	-			0.89	-	-
17	PTE	8.38	8.38	8.38	18.84	27.86	9.27	46.43	27,473
18	Ac	ctual to	Potential (l	DDG Cooler and Transport System EU-32)					
19				· · · · · · · · · · · · · · · · · · ·	T	T	0.00	1	
	Baseline	0.00	0.00	0.00	-	-	0.00	-	-
21 22	PTE Emissions Increase (ATPA)	7.91 7.91	5.01 5.01	2.01 2.01	-	-	9.16 9.16	-	-
23	Emissions increase (ATPA)	7.31	3.01	2.01			9.10		_
24		Ac	tual to Proj	iected Actual (EU-32 Rotary Dryers)					
	Baseline	21.45	21.45	21.45	T -	T -	635.51	T -	_
	Projected Actuals	19.85	19.85	19.85	-	-	587.94		-
27	Emissions Increase (ATPA)	<0	<0	<0	-	-	<0	-	-
28	· · · · · ·			Hybrid Test		***************************************	*******************************	***************************************	
29				-					
	Total PTE New Units	8.38	8.38	8.38	18.84	27.86		46.43	27,473
-	Total Emissions Increase from ATPA	7.91	5.01	2.01			9.16	<u> </u>	
32	Hybrid Test Emissions Increase		13.38	10.39	18.84		18.42	+	27472.88
33	PSD Significant Threshold	25	15	10	40	40	40	100	75,000
34									
35	PM2.5 Net Emissions (ton/yr)	40.00							
	Emissions Increase from ATPA	10.39							
37	Contemporaneous Netting	21 45							
	EU-32 Rotary Dryers - Baseline	21.45 19.85							
	EU-32 Rotary Dryers - Projected Actuals Project Reductions - EU-32 Rotary Dryers	-1.61							
41	AA 029-32386-00005 (issued 12/17/12) - add 3 boiler								
	3 Boilers - Baseline	0.00							
	3 Boilers - Projected Actual	0.00							
	Projected Increases from 3 Boilers	0.41							
44	Projected increases normal bollers	U.4 I							

	A	В	С	D	E	F	G	Н	l
45	Renewal T029-32119-00005 (issued 06/20/14) - remov	е 3							
46	3 Boilers - Baseline	0.00							
47	3 Boilers - Projected Actual	-0.41							
48	Projected Decrease from 3 Boilers	-0.41							
49	Emissions Increase	8.78							
50	PSD Significant Threshold	10							
51									
52	Note: Baseline emissions for the DDG Cooler and Transpor	t Syste	m are assur	ned to be zero. The transport system has new units being	added.				
53	MGPI's production is bottlenecked at the existing stills which	n are no	t being mod	lified. Any increase in production could have been accomr	modated	d with the	e existing	dryers.	

Cell: B37
Comment: jlacker:

you need to show the baseline to projected actuals for all (+)/(-) and document the baseline year.

KW - done

	АВ	С	D	E	T F	G	L	l ,	JK		M
1	A B		<u> </u>	<u> </u>	<u> </u>	Appendix B:	Fmissions	Calculations	JJK	<u>L</u>	IVI
2							DDG Dryer (E				
						•					
3											
4					Com	pany Name:	MGPI of Ind	iana, LLC			
5						Address:	7 Ridge Ave	nue, Lawrence	burg, Indiana 4702	25	
6				Significa	ant Source Modi	ification No.:	0296-35496-	00005			
7				_	ant Permit Modi						
				Olgillic	ant Fermit Modi						
8							Kristen Will	ougnby			
9						Date:	12/22/2014				
10							_				
			Hourly	Annual	Heat Content	Fuel Usage]				
11	Coi	nbustion Source	MMBtu/hr	MMBtu/yr	(Btu/scf)	(MMcf/yr)					
12	Direct-fired Dryer H	eat Input Capacity ^(a)	45	394,200	1,020	386.47]				
13	RTO H	eat Input Capacity ^(a)	8	70,080	1,020	68.71					
14	Total	Heat Input Capacity	53	464,280		455.18]				
15					-						
16	Pro	duction Capacity	ton/hr	ton/yr							
17		Draduction (b)	9.56	83,754							
18				-	7						
19			Pollutant	Control Efficiency							
ļ	Control Efficiency Fo	r Criteria Emissions	HAPs	97%							
21	(% Ren		VOC	98%							
21 22	(70 11011	iovaij	CO	90%	1						
23			PM/PM ₁₀ /PM _{2.5}	98%	7 00						
24				000000000000000000000000000000000000000	4						
25		Pollutant	NOx		CC)		SO ₂	VOC		PM
25 26	Emissions From	Uncontrolled	0.12		2.0	0		0.45	10.0	1	0.0
27	DDG Drying (EU-3	Emission Factor	lbs/MME	tu	lbs/Mi	MBtu	lbs	ton DDG	lbs/ton DDG	lbs/to	on DDG
27 28		Units	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr tpy	lbs/hr	tpy
29	Uncontro		6.36	27.86	106.00	464.28	4.30	18.84	95.61 418.77	95.61	418.77
30	Control		-	_	10.60	46.43	-	-	1.91 8.38	1.91	8.38
31											
	HAP Emissions		Acetaldeh	yde	Formalo	lehyde	A	crolein	Methanol		
32	From DDG Drying	Pollutant	0.5					0.04	0.44	Total HAP (from Nat	ural Gas Combustion)
33	From DDG Drying (EU-39)	Uncontrolled Emission	0.5 Ibs/ton DI	ngs	0.3 lbs/ton		_ _	0.01 ton DDGS	0.11 lbs/ton DDGS	See	Below
35		Units	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr tpy	lbs/hr	tpy
36	Uncontrolled PTE		4.78	20.94	2.96	12.98	0.10	0.42	1.05 4.61	0.09	0.41
<u></u>	Controlled PTE		0.14	0.63	0.09	0.39	0.00	0.01	0.03 0.14	2.82E-03	0.01

	<u> </u>	В		С	D	E	F	G	Н		J	K	L		M
38	MGPI of	f Indiana,	LLC				DDG Dryer (EU	-39) Continue	ed						Significant Source Modificaiton No.
39	7 Ridge	Avenue,	Lawrencel	burg, Indiar	na 47025										Significant Permit Modification No.
40											1				
41							ombustion HAPs	- Organics							
					Benzene	Dichlorobenze	Formaldehyde	Hexane	Toluene	Total - Organics					
42						ne				. otal organio					
	Emissio	n Factor in	lb/MMcf		2.1E-03	1.2E-03	Included	1.8E+00	3.4E-03						
44							Above								
45					. ====					4.440= 04					
	Potentia	I Emission	in tons/yr		4.779E-04	2.731E-04		4.097E-01	7.738E-04	4.112E-01					
47															
48							Combustian IIAF)a Matala							
49					Ll		Combustion HAF	_	NI:-11	Total - Metals					
50			16 /8 /8 / 8 / e £		Lead	Cadmium	Chromium	Manganese	Nickel	i otai - Metais					
51 I	EMISSIO	n Factor in	ID/IVIIVICT		5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03						
53															
ļI	Dotantia	l Emission	in tons/yr		1.138E-04	2.503E-04	3.186E-04	8.648E-05	4.779E-04	1.247E-03					
55	Otontia	11 1111331011	in tons/yi		1.130L-04	2.5052-04	3.100L-04	0.0402-05	4.7752-04	1.2-7/ =-00					
56					<u> </u>				1						
	Notes:	Design	heat inputs	s of direct fir	ed dryer and of them	nal oxidizer provid	led by the manu	facturer (ICM.	Inc.).						
		_	-		-	-	-	-	•	sed system will be e	auivalen	t to combined capac	city of the exist	ting steam-tube	dryers (portion of existing EU-32). Materia
		(,			, 9 (= = -,		,,,,		,		4		,	9	, (F
58															
59	1	(b)			.	(lb/hr)	%solids	-							
60					Dryer fee		35.5%								
61 62					Water / Evaporation	·	0% 90%								
63		ا میں م	onorations	accumo the	DDG Production	,		ioly throughou	t the year						
64					at the proposed dryer					or (ICM Inc.) Assu	mo DM/E	DM omissions are	oquivalent I In	ador the Part 70	Permit Program particulate matter with an
65															n the DDG drying operations and natural ga
66		Method		2 (1111331011 16	actors and thermal ox	ddizer control em	sicilcies provided	by the manus	acturer (rowr,	inc.). Linission lac	.013 101 3	pecilio Fizir 3 ilicidai	c both process	5 (11113310113 11011	in the DDO drying operations and natural ga
67		(d) NOx ar													
68		` '		(lb/hr) = [Un]	controlled Emission	Factor (lb/MMBtu) x Design Firing	Rate (MMBtu	/hr)]						
69				· , •	Incontrolled Emission	•	, ,	•	, -	b/ton1					
70		SO2:		, , , ,		`	, 3	•	, ,	•					
71		Uncont	rolled PTE	(lb/hr) = [Un	controlled Emission	Factor (lb/ton DD	G) x Production	Rate (ton/hr)]							
72		Uncont	rolled PTE	(ton/yr) = [U	Incontrolled Emissior	Factor (lb/ton D	DG) x Productior	Rate (ton/yr)	/ 2,000 lb/ton]					
73		VOC, F	M/PM10/P	M2.5:											
74		Contro	lled PTE (lb	o/hr) = [Cont	rolled Emission Facto	or (lb/ton DDG) x	Production Rate	(ton/hr)]							
75		Contro	lled PTE (to	on/yr) = [Cor	ntrolled Emission Fac	tor (lb/ton DDG)	x Production Rat	e (ton/yr) / 2,0	00 lb/ton]						
76					controlled PTE (lb/hr	, ,	- / -								
77					ontrolled PTE (tpy) x	(1 - Control Effic	iency)]								
78		`		sion factor):			_, _								
79					controlled Emission					•					
80					Incontrolled Emission	•	-		/ 2,000 lb/ton	J					
81			•		ntrolled Emission Ra		• •								
82			•	- / -	controlled Emission R	tate (ton/yr) x (1-	Control Efficiency	/)]							
83		`		nission facto	•		4.4.9.000.44.0	2 006 02 4 24	000 00 4 0	0.000.00	000 00				
84					42, Chapter 1.4, Tal				1-006-02, 1-0	3-006-02, and 1-03-	106-03				
85			on (tons/yr)	– mougnp	out (MMCF/yr) x Emis	SOUTH ACTOL (ID/IV	11VIOF)/2,000 ID/E	JII							

A B C	D	E	F	G	Н	1	J	K	L	M
86 MGPI of Indiana, LLC			DDG Dryer (El	J-39) Continued					gnificant Source Modificaiton	No.: 0296-35276-00005
7 Ridge Avenue, Lawrenceburg, Indiana	a 47025							Si	gnificant Permit Modification	No.: T029-32119-00005
89 Greenhouse Gas Calculations										
90	000000000000000000000000000000000000000	000000000000000000000000000000000000000		7						
91		enhouse Gas	T NAC	J						
92 93 Emission Factor in lb/MMcf	CO2	CH4 2.3	N2O 2.2							
94	120,000	2.3	2.2							
95				1						
96 Potential Emission in tons/yr	27,311	0.52	0.50							
97										
98										
99 Summed Potential Emissions in tons/yr		27,312								
100				-						
102 CO2e Total in tons/yr		27,473								
103		,								
104				-						
105 Methodology										
106 The N2O Emission Factor for uncontrolled										
107 Emission Factors are from AP 42, Table 1. 108 Global Warming Potentials (GWP) from Ta				na 1-03-006-03.						
109 Emission (tons/yr) = Throughput (MMCF/y										
110 CO2e (tons/yr) = CO2 Potential Emission t				vr x CH4 GWP (25) + N2O					

1 2 3 4 4 5 5 6 7 8 9 10 11 11 12 13 14 15 16 16 17 18 19 20 21 122 23 24 25 PM₁₀		N	0	Р	Q
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 PM₁₀ PM₂₅ 10.0 Ibs/to DDG Ibs/to DDG Ibs/to DDG Ibs/to DDG Ibs/to DDG Ibs/to DDG 27 8 19 29 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 35 Ibs/hr tpy 36 8.99 39.36	1				
4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 PM₁0 DPG 10 10 10 10 10 10 10 1	2				
5 6 7 8 9 100 111 12 13 14 15 16 16 17 18 18 19 20 21 22 23 24 25 PM₁	3				
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 PM₁₀ PM₂₅ 26 10.₀ 10.₀ 10.₀ 27 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 30 1.91 8.38 31 Total HAP Emissi∪s(e) 36 8.99 39.36	4				
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	5				
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 PM₁₀ PM₂₅ 26 10.0 10.0 1bs/ton DDG lbs/tor DDG 27 lbs/tor tpy lbs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 35 lbs/hr tpy 36 8.99 39.36	6				
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 PM ₁₀ PM ₂₅ 26 10.0 PM ₂₅ 26 10.0 Ibs/tor DDG 27 lbs/ton DDG lbs/tor DDG 28 lbs/hr tpy lbs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 35 lbs/hr tpy 36 8.99 39.36	7				
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	8				
11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	9				
12 13 14 15 16 17 18 19 20 21 22 23 24 25 PM₁₀ PM₂₅ 26 10.0 10.0 27 lbs/ton DDG lbs/ton DDG 28 lbs/hr tpy lbs/hr tpy 29 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 35 lbs/hr tpy 36 8.99 39.36	10				
13 14 15 16 17 18 19 20 21 22 23 24 25	11				
14 15 16 17 18 19 20 21 22 23 24 25					
15 16 17 18 19 20 21 22 23 24 25					
16 17 18 19 20 21 22 23 24 25					
17 18 19 20 21 22 23 24 25					
18 19 20 21 22 23 24 25					
19 20 21 22 23 24 25					
20 21 22 23 24 25	18				
21 22 23 24 25	19				
22 23 24 25 PM ₁₀ PM _{2.5} 26 10.0 10.0 27 Ibs/ton DDG Ibs/ton DDG 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 35 Ibs/hr tpy 36 8.99 39.36	20				
23 24 25 PM₁₀ PM₂₅ 26 10.0 10.0 27 Ibs/ton DDG Ibs/ton DDG 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31					
24 25 PM₁₀ PM₂₅ 26 10.0 10.0 27 Ibs/ton DDG Ibs/ton DDG 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31	22				
PM₁0 PM₂5 26 10.0 10.0 10s/ton DDG Ibs/ton DDG 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 35 Ibs/hr tpy 36 8.99 39.36					
26 10.0 Ibs/ton DDG Ibs/hr by 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 35 Ibs/hr tpy 36 8.99 39.36	24				
27 Ibs/ton DDG Ibs/ton DDG 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31				PN	N _{2.5}
27 28 Ibs/hr tpy Ibs/hr tpy 29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 35 Ibs/hr tpy 36 8.99 39.36	26	10.0)	10	0.0
29 95.61 418.77 95.61 418.77 30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 33 34 1.91 8.38 35 lbs/hr tpy 36 8.99 39.36		lbs/ton	DDG	lbs/to	n DDG
30 1.91 8.38 1.91 8.38 31 Total HAP Emissions(e) 35 lbs/hr tpy 36 8.99 39.36	28	lbs/hr	,		tpy
31 Total HAP Emissions ^(e) 35 lbs/hr tpy 36 8.99 39.36					
Total HAP Emissions ^(e) 35 lbs/hr tpy 36 8.99 39.36		1.91	8.38	1.91	8.38
32 Emissions(e) 34 5 lbs/hr tpy 36 8.99 39.36	31			ı	
34 35 lbs/hr tpy 36 8.99 39.36					
35 lbs/hr tpy 36 8.99 39.36					
		lbs/hr	tpy		
37 0.27 1.18		8.99	,		
	37	0.27	1.18		

N O P Q 38 0296-35276-00005 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62 63
39 T029-32119-00005 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
44 45 46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
46 47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
47 48 49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
48 49 50 51 52 53 54 55 56 57 valance is as follows: 58 59 60 61 62
49 50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61
50 51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
51 52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
52 53 54 55 56 57 palance is as follows: 58 59 60 61 62
53 54 55 56 57 palance is as follows: 58 59 60 61 62
54 55 56 57 valance is as follows: 58 59 60 61 62
55 56 57 palance is as follows: 58 59 60 61 62
56 57 palance is as follows: 58 59 60 61 62
57 palance is as follows: 58 59 60 61 62
balance is as follows: 58 59 60 61 62
58 59 60 61 62
59 60 61 62
59 60 61 62
60 61 62
62
63
L
64 rodynamic diameter less
65 combustion
66
67
68
69
70
71
72
73
74
75
76
78
79
80
81
82
83
84
85

	N	0	Р	Q
86				
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				
99				
100				
101				
102				
103				
104				
105				
106				
107				
108				
109				
110				

	A B	C D	E	F	G	Н	I	J	K	L	M	N	0	Р	Q
1					Appendix	(B: Emissions Calculations									
2						Wet Pad (EU-40)									
3															
4				Compa	ny Name:	MGPI of Indiana, LLC									
5					Address:	7 Ridge Avenue, Lawrenceburg, Indiana 47025									
6		Signific	ant Sourc	e Modific	ation No.:	0296-35496-00005									
7		Signific	ant Perm	it Modific	ation No.:	029-35505-00005									
8				ı	Reviewer:	Kristen Willoughby									
9					Date	: 12/22/2014									
10															
			8	ontrolled	000000000000000000000000000000000000000	0.0083	0.0	001	0.0	0002	0.0	002	0.0	0004	
11	Emission Unit	Emission Point ^(a)		Emission		0.0083 lb/ton wet cake	ιυ/το	II MET		0002 wet cake	ιυ/ ιυ	II MET		0004	Tota Emis
	Emission Unit	Emission Point ^(a)					8	II MET	lb/ton v		ιυ/ ιυ		ID/LU	nı wet	Tota Emis
11 12	Emission Unit		Dryer	Emission Eactors ^(b)	(lb/hr)	lb/ton wet cake	Acetal(ii wei lenyae)	lb/ton v	wet cake plein ^(d)	ID/IO	n wei denyae _{d)}	Meth		Emis
11 12 13	Emission Unit	Emission Point ^(a) Wet Cake Production, Storage, and Loadout	Dryer (ton/hr)	Emission Factors ^(b) Feed ^(c)	(lb/hr)	lb/ton wet cake VOC ^(d)	Acetaid (lb/hr)	ii wet ienyde) (ton/yr)	lb/ton v Acro (lb/hr)	wet cake plein ^(d)	r ormal (lb/hr)	n wei denyae _{d)}	Meth	anol ^(d) (ton/yr)	Emis (lb/hr)
11 12 13 14 15	EU-40	Wet Cake Production, Storage,	Dryer (ton/hr)	Emission Eactors ^(b) Feed ^(c) (ton/yr)	(lb/hr)	Ib/ton wet cake VOC ^(d) (ton/yr)	Acetaid (lb/hr)	ii wet ienyde) (ton/yr)	lb/ton v Acro (lb/hr)	wet cake blein ^(d) (ton/yr)	r ormal (lb/hr)	n wet denyde d) (ton/yr)	Meth (lb/hr)	anol ^(d) (ton/yr)	Emis (lb/hr)
11 12 13 14 15 16	EU-40 Notes:	Wet Cake Production, Storage, and Loadout	Dryer (ton/hr) 24.56	Emission Factors ^(b) Feed ^(c) (ton/yr) 215,154	(lb/hr) 0.20	Ib/ton wet cake VOC ^(d) (ton/yr) 0.89	(lb/hr)	(ton/yr)	Acro (lb/hr)	wet cake blein ^(d) (ton/yr) 0.0022	(lb/hr)	u wet denyde d) (ton/yr) 0.022	Meth (lb/hr)	nanol ^(d) (ton/yr) 0.0043	Emis (lb/hr)
11 12 13 14 15 16 17 18	EU-40 Notes: (a) VOC and h	Wet Cake Production, Storage, and Loadout HAP emissions can res	Dryer (ton/hr) 24.56	Emission Factors ^(b) Feed ^(c) (ton/yr) 215,154 periods of	(lb/hr) 0.20 f dryer star	Ib/ton wet cake VOC ^(d) (ton/yr) 0.89 t-up and shutdown, when the dryer throughput may be of	(lb/hr) 0.002	(ton/yr)	Acro (lb/hr) 0.0005	wet cake blein ^(d) (ton/yr) 0.0022	(lb/hr)	u wet denyde d) (ton/yr) 0.022	Meth (lb/hr)	nanol ^(d) (ton/yr) 0.0043	Emis (lb/hr)
11 12 13 14 15 16 17 18 19	EU-40 Notes: (a) VOC and H (b) Emission f	Wet Cake Production, Storage, and Loadout HAP emissions can reseator for wet cake take	Dryer (ton/hr) 24.56 sult during	Emission Factors ^(b) Feed ^(c) (ton/yr) 215,154 periods of similar ope	(lb/hr) 0.20 f dryer star	Ib/ton wet cake VOC ^(d) (ton/yr) 0.89 t-up and shutdown, when the dryer throughput may be onitted in Indiana under Permit #T095-30443-00127 (PO	(lb/hr) 0.002	(ton/yr)	Acro (lb/hr) 0.0005	wet cake blein ^(d) (ton/yr) 0.0022	(lb/hr)	u wet denyde d) (ton/yr) 0.022	Meth (lb/hr)	nanol ^(d) (ton/yr) 0.0043	Emis (lb/hr)
11 12 13 14 15 16 17 18 19 20 21	EU-40 Notes: (a) VOC and h (b) Emission fi (c) Hourly drye	Wet Cake Production, Storage, and Loadout HAP emissions can reseactor for wet cake take take take take take take take t	Dryer (ton/hr) 24.56 sult during in from a staken from	Emission Factors ^(b) Feed ^(c) (ton/yr) 215,154 periods of similar ope	(lb/hr) 0.20 f dryer star	Ib/ton wet cake VOC ^(d) (ton/yr) 0.89 t-up and shutdown, when the dryer throughput may be of	(lb/hr) 0.002	(ton/yr)	Acro (lb/hr) 0.0005	wet cake blein ^(d) (ton/yr) 0.0022	(lb/hr)	u wet denyde d) (ton/yr) 0.022	Meth (lb/hr)	nanol ^(d) (ton/yr) 0.0043	Emis (lb/hr)
11 12 13 14 15 16 17 18	EU-40 Notes: (a) VOC and h (b) Emission f (c) Hourly drye (d) Methodolog	Wet Cake Production, Storage, and Loadout HAP emissions can reseator for wet cake take	Dryer (ton/hr) 24.56 sult during in from a staken from attaken from at	Emission Factors ^(b) Feed ^(c) (ton/yr) 215,154 periods of similar ope in the mate	(lb/hr) 0.20 f dryer star ration pernerial balance	Ib/ton wet cake VOC ^(d) (ton/yr) 0.89 t-up and shutdown, when the dryer throughput may be onitted in Indiana under Permit #T095-30443-00127 (PO) ce provided by ICM dated 1/30/2015.	(lb/hr) 0.002	(ton/yr)	Acro (lb/hr) 0.0005	wet cake blein ^(d) (ton/yr) 0.0022	(lb/hr)	u wet denyde d) (ton/yr) 0.022	Meth (lb/hr)	nanol ^(d) (ton/yr) 0.0043	Emis (lb/hr)

	R
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
1 1	II HAP
12	I HAP
12	I HAP sions
12 13 14	sions
13 14	
13 14 15	sions (ton/yr)
13 14 15 16	sions (ton/yr)
13 14 15 16 17	sions (ton/yr)
13 14 15 16 17 18	sions (ton/yr)
13 14 15 16 17 18 19	sions (ton/yr)
13 14 15 16 17 18 19 20	sions (ton/yr)
13 14 15 16 17 18 19 20 21	sions (ton/yr)
13 14 15 16 17 18 19 20	sions (ton/yr)

A	ВС	D	E	F	G	Н	I
1 2 3		DDG Cooler and Transport System Projected Emission Estimates (Emissions Calculations			
5 5 6 7 8 9			Source Modification No.: 02 Permit Modification No.: 02 Reviewer: Kr	Ridge Avenue, Lawrenceburg, Indiana 47025 296-35496-00005			
Emission Unit	Emission Point	Description	Stack ID	Uncontrolled PM Emission Factor	Uncontrolled PM ₁₀ Emission Factor	Uncontrolled PM _{2.5} Emission Factor	DDG thre
12				(lb/ton)	(lb/ton)	(lb/ton)	(ton/hr)
EU-32	4 Screw Conveyors, 2 Drag Conveyors, 3 Product Conveyors, 1 K-Valve	Grain Conveying	S-310	0.061	0.034	0.0058	9.56
14	Drum Cooler	Grain Conveying	NA	0.061	0.034	0.0058	
15							
16							
Emission Unit	Emission Point	Description	Stack ID	Controlled PM Emission Factor	Controlled PM ₁₀ Emission Factor	Controlled PM _{2.5} Emission Factor	DDG thre
18				(lb/ton)	(lb/ton)	(lb/ton)	(ton/hr)
EU-32	Hammer Mill	Hammer Milling ^(b)	S-310	0.067	0.052	0.036	9.56
20							
) Factors taken from AP-42, Fifth	Edition, Volume 1, Section 9.9.1 (Grain Elevators and Processes). pendix B.2, Table B.2.2 for Category 7 - "Grain Processing" on Page 17, to Collection Efficiency 80%	the particle size distribution for Controlled Wt 0.046	or PM ₁₀ is 61% of Total PM and for PM _{2.5} is 23% of To Controlled wt% 54%	otal PM for uncontrolled emissions.	Additionally, AP	-42 Append
-0	1 1012.5			22%			
	DM +0 DM 280/	Ω Ε 0/.	0.010				
27	PM _{2.5} to PM ₁₀ 38%	95%	0.019				
	PM _{2.5} to PM ₁₀ 38% PM ₁₀ and higher 39%	95% 95%	0.019 0.0195 0.0845	23%	_		

20 84001 -61-	B C	D	E	F	G	Н	T
	diana, LLC			Cool	ler Emissions (Continued	d)	
	venue, Lawrenceburg, Indiana 470	25					
40							
41							-
42				Uncontrolled Emission	0.219		0.0
43 Emission	Emission Point	Description		Factors ^(a)	Ib/ton DDG	}	lbs/ton
44 Unit		•		DDG throughput	VOC		Acetald
45			(ton/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)
46	Drum Cooler	Cooling Drum Apparatus					
47	Existing Screw Conveyor	Grain Conveying		00.754	0.00	0.40	
EU-32	New 3 Screw Conveyors, 2 Drag		9.56	83,754	2.09	9.16	0.16
		Grain Conveying					
48	Conveyors, 1 K-Valve						
	Existing Hammer Mill and	Hammer Milling					
49	Cyclone	The state of the s				***************************************	***************************************
50							
51 Methodolog							
	a) voc. emission factor for DDG co		WT400 04404 00000 (DOET Diamet	Sining North Manageraton LIAD amigains footons and d		the MOO emission	f
E2 /		oling taken from a similar operation permitted in indiana under Permit i	#T169-31191-00068 (POET Bioref	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
53 (t	(b) Methodology:		#T169-31191-00068 (POET Bioref	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
53 (I	(b) Methodology: Emission rate (lb/hr) = DDG Thro	oughput (ton/hr) X DDG Cooling Emission factor (lb/ton)	#T169-31191-00068 (POET Bioref	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55	(b) Methodology: Emission rate (lb/hr) = DDG Thro		#T169-31191-00068 (POET Bioref	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thr	oughput (ton/hr) X DDG Cooling Emission factor (lb/ton)	#T169-31191-00068 (POET Bioref	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55	(b) Methodology: Emission rate (lb/hr) = DDG Thro	oughput (ton/hr) X DDG Cooling Emission factor (lb/ton)	#T169-31191-00068 (POET Bioref	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thr	oughput (ton/hr) X DDG Cooling Emission factor (lb/ton) roughput (ton/yr) X DDG Cooling Emission factor (lb/ton) x ton/2,000 lb		fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thro Dryer emissions	rughput (ton/hr) X DDG Cooling Emission factor (lb/ton) roughput (ton/yr) X DDG Cooling Emission factor (lb/ton) x ton/2,000 lb	#T169-31191-00068 (POET Bioref	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thr Dryer emissions VOC	tpy from Drying 8.38	% of VOC	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thro Dryer emissions	tpy from Drying 8.38 0.63	% of VOC	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thr Dryer emissions VOC Acetaldehyde	tpy from Drying 8.38 0.63 0.001	% of VOC 7.50%	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60 61 62	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thr Dryer emissions VOC Acetaldehyde Acrolein	tpy from Drying 8.38 0.63 0.01 0.39	% of VOC 7.50% 0.15%	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60 61 62 63 64	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thro Dryer emissions VOC Acetaldehyde Acrolein Formaldehyde	tpy from Drying 8.38 0.63 0.01 0.39	% of VOC 7.50% 0.15% 4.65%	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60 61 62 63 64 65	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thro Dryer emissions VOC Acetaldehyde Acrolein Formaldehyde	tpy from Drying 8.38 0.63 0.01 0.39 0.14	% of VOC 7.50% 0.15% 4.65%	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60 61 62 63 64 65 66	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thro Dryer emissions VOC Acetaldehyde Acrolein Formaldehyde Methanol	tors tughput (ton/hr) X DDG Cooling Emission factor (lb/ton) toughput (ton/yr) X DDG Cooling Emission factor (lb/ton) x ton/2,000 lb tpy from Drying 8.38 0.63 0.01 0.39 0.14	% of VOC 7.50% 0.15% 4.65%	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60 61 62 63 64 65 66 67	(b) Methodology: Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thro Dryer emissions VOC Acetaldehyde Acrolein Formaldehyde Methanol Other DDG Cooler Emission Fac POET Biorefining - N Manchester	tors tughput (ton/hr) X DDG Cooling Emission factor (lb/ton) toughput (ton/yr) X DDG Cooling Emission factor (lb/ton) x ton/2,000 lb tpy from Drying 8.38 0.63 0.01 0.39 0.14	% of VOC 7.50% 0.15% 4.65% 1.65%	fining - North Manchester). HAP emission factors are d	erived as a percentage of	the VOC emission	factor prese
54 55 56 57 58 59 60 61 62 63 64 65 66	Emission rate (lb/hr) = DDG Thro Emission rate (ton/yr) = DDG Thro Dryer emissions VOC Acetaldehyde Acrolein Formaldehyde Methanol Other DDG Cooler Emission Fac POET Biorefining - N Mancheste 5.685	tors rughput (ton/hr) X DDG Cooling Emission factor (lb/ton) toughput (ton/yr) X DDG Cooling Emission factor (lb/ton) x ton/2,000 lb tpy from Drying 8.38 0.63 0.01 0.39 0.14	% of VOC 7.50% 0.15% 4.65% 1.65%		erived as a percentage of	the VOC emission	factor prese

	J	К	L	М	N	0	Р	Q	R	S	Т	U	V
1													
3													
4													
5													
6													
7 8													
9													
10													
	ut	PM Er	ntrolled mission	PM ₁₀ E	ntrolled mission	PM _{2.5} E			Controlled PM Emission Rate	Controlled PM ₁₀ Rate	Emission	PM _{2.5} E	trolled Emission
11			ate		ate		ate		T				ate
12	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	<u> (lb/hr)</u> 	(ton/yr)
13	83,754	0.58	2.55	0.33	1.42	0.06	0.24	0.09	0.38	0.05	0.21	0.01	0.04
14		0.58	2.55	0.33	1.42	0.06	0.24	0.58	2.55	0.33	1.42	0.06	0.24
	Totals	1.17	5.11	0.65	2.85	0.11	0.49	0.67	2.94	0.37	1.64	0.06	0.28
16						I				<u></u>		Т	
17	ut		olled PM on Rate	PM ₁₀ E	trolled mission ate	PM _{2.5} E	rolled mission ate	I	Uncontrolled PM Emission Rate	Uncontrolled Emission		PM _{2.5} E	ntrolled Emission tate
	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
19	83,754	0.64	2.81	0.49	2.16	0.35	1.53	12.81	56.12	9.86	43.17	1.74	7.64
	Totals	0.64	2.81	0.49	2.16	0.35	1.53	12.81	56.12	9.86	43.17	1.74	7.64
21													
21 22 23													
	x B.2, Tab	ole B.2.3	3 "Typical	Collecti	on								
25													
25 26													
27													
28													
29													
30 31													
32													
33													
33 34													
30 31 32 33 34 35 36 37													

	J	K	L	М	N	0	Р	Q	R	S	Т	U	V
38							-		Significant Source Modification No.:				
39									Significant Permit Modification No.:				
40									-				
41										_			
42	6		0033		010		036						
43	OG		n DDG		n DDG		n DDG		Total HAP Emissions				
44			olein		ldehyde		nanol	***************************************					
45	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)				
46													
47	0.00	0 0004	0.044	0.40	0.40	0.004	0.45	0.000	4.00				
	0.69	0.0031	0.014	0.10	0.43	0.034	0.15	0.292	1.28				
40													
48													
49													
50	vannannannannannannannannannannannannann	nneennnneennnneennnneenn		annasannanasannas		nnoonnnoonnnoonnnoon	nnnonnnnnnnnnnnnnnnnnnnnn			ı			
51													
	nted, ass	umina th	at individ	ual HAF	s are em	itted in t	he same	proportion	from cooling as from the drying emissions				
53	· · · · · · · · · · · · · · · · · · ·								,				
54													
54 55 56													
56													
57													
58													
59													
60													
61 62													
63													
64													
65													
65 66 67													
67													
68													
69													

Cell: G10

Comment: jlacker:

to help clarify - add the stack the emissions vent to

KW - done

Cell: Q14

Comment: jlacker:

permit states emissions from the drum cooler are uncontrolled?

KW - Fixed

	D	E	F				
1		Appendix B: Emissions Calculations					
2		EU-32 Rotary Dryer Baseline Emissions					
3							
4	Company Name:	MGPI of Indiana, LLC					
5	Address:	7 Ridge Avenue, Lawrenceburg, Indiana 47025					
6	nt Source Modification No.:	0296-35496-00005					
7	nt Permit Modification No.:	029-35505-00005					
8	Reviewer:	Kristen Willoughby					
9	Date:	12/22/2014					

		Ţ			
	A	B C	D	E	F
	EU-32 Rotary Dryers				
12					
13	PM, PM ₁₀ , PM _{2.5} Emissions				
	Constituent	Dryer Feed Rate ^(a)	Controlled Emission Factor ^(b)	Controlled Emissions ^(c) (ton/yr)	
14		(ton/yr)	(lb/ton)	(10111)	
15	PM		0.27	21.45	
16	PM10	158,894	0.27	21.45	
17	PM2.5		0.27	21.45	
18					
19	Notes:				
	(a)	Feed (wet cake) into existing	g steam tube dryer system is taken	from facility records as the average over the 24-month	period from January
20		2013 - December 2014.			
21	(b)	Controlled emission Factor	from AP-42, Table 9.9.7-1. The en	nission estimation methodology used matches that pro-	vided in the IDEM
22 23	(c)	Methodology:			
23		Controlled Emissions (ton/y	r) = Usage (ton/yr) x EF (lb/ton) / 2,	000 lb/ton	
24		PM2.5 emissions conservat	ively assumed to be equal to PM10	emissions.	
25					
26	VOC Emissions				_
		Water	VOC Content of Water ^(b)	VOC from Dryers	
	Dryer Feed Rate (ton/	/yr) Content ^(b)	(lb VOC/lb water)	(ton/yr)	
27		(% by wt)	(ib VOC/ib water)	(toll/yl)	
28	158,894	66.66%	0.006	635.51]
29					_
30	Notes:				
31	(a)	Feed (wet cake) into existing	g steam tube dryer system is taken	from facility records as the average over the the 24-mo	nth period from
32	(b)	Water content (% wt) and \	OC content of water (lb VOC/lb wa	ater) taken from May 22, 2014 ATSD, Appendix A, Pag	e 8 of 23, for permit
33	(c)	Methodology and Sample C	alculations:		
34		VOC (ton/yr) = Dryer Feed	Rate (ton/yr) x Water Content of Fe	ed (% by wt) x (lb VOC/lb water)	

	D	E	F				
1		Appendix B: Emissions Calculations					
2	EU-32 Rotary Dryer	EU-32 Rotary Dryer Projected Actual Emissions					
3							
4	Company Name:	MGPI of Indiana, LLC					
5	Address:	7 Ridge Avenue, Lawrenceburg, Indiana 47025					
6	ce Modification No.:	0296-35496-00005					
7	nit Modification No.:	029-35505-00005					
8	Reviewer:	Kristen Willoughby					
9	Date:	12/22/2014					

	A B	C	D	E	F	G
	EU-32 Steam Tube Rotary Dryers					
12						
13	PM, PM ₁₀ , PM _{2.5} Emissions		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
		Dryer Feed Rate ^(a)	Controlled Emission	Controlled Emissions ^(c)		Uncon
	Constituent		Factor ^(b)	(ton/yr)		Emiss
14		(ton/yr)	(lb/ton)			(tor
15	PM		0.27	19.8		13
16	PM10	147,000	0.27	19.8		13
17	PM2.5	***************************************	0.27	19.8		13
18						
19	Notes:				r , ,	
	(a) Feed (we	t cake) into existing stea	im tube dryer system is	based on operation as back-up to the proposed direct-	iired aryer.	
20	4)		AD 40 T I I 00 T 4 T			
21	, ,		AP-42, Table 9.9.7-1. TI	ne emission estimation methodology used matches tha	t provided i	the IDEM q
22 23	(c) Methodol		(ton/w) v FF (lb/ton	2 / 2 000 lb/ton		
24			sage (ton/yr) x EF (lb/tor			
25			assumed to be equal to I			
	` '			rol efficiency for controlled emissions.		
26	PM _{2.5} em	ssions conservatively as	ssumed to be equal to P	M ₁₀ emissions.		
27						
28	VOC Emissions					
29	VOC EIIIISSIOIIS		VOC Content of		1	
	Dryer Feed Rate (ton/hr)	Water Content ^(b) (%	Water ^(b) (lb VOC/lb	VOC from Dryers (ton/yr)		
30	Diyei Feed Nate (toli/lil)	by wt)	1 ' 1	voc nom bryers (tomyr)		
31	147,000	66.66%	water) 0.006	587.9		
32	147,000	1 00.0078	0.000	307.9	J	
	Notes:					
34		t cake) into existing stea	am tube dryer system is	based on operation as back-up to the proposed direct-	fired dryer.	
35				lb water) taken from May 22, 2014 ATSD, Appendix A,		
36	(c) Methodol			······································		
37		0.	(ton/yr) x Water Content	of Feed (% by wt) x (lb VOC/lb water)		
38	•	• /		, , , , , , , , , , , , , , , , , , , ,		
39	HAP Emissions					
		HAP% ^(a)	HAP from Dryers			
40	HAP	(by wt of VOC)	(ton/yr)			
41	Acetaldehyde	6.18%	36.3			
42	Acrolein	0.37%	2.2			
43	Methanol	1.24%	7.3			
44	Formaldehyde	0.04%	0.2			
45	Total		46.0			
46						
47	Notes:					

	А	В	С	D	E	F	G
48	(a)	HAP comp	osition taken from Mav	22, 2014 ATSD, Appe	ndix A. Page 8 of 23, for permit T029-32119-00005.		

	Н
11	
12	
13	
	rolled
	ons ^(d)
14	
L	<u>(vr)</u>
15	2.3
16	2.3
17	2.3
18	
19	
20	
21	ocument
22	Cournell
23	
24	
25	
26	
27	
28	
29	1
25	
100	
30	
31	
32	
33	
34	
35	1
36	1
37	1
37 38	
39	
139	
,_	
40	
41]
42	
43	
44]
45	
46	1
47	
L * /	L

	Н
48	